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ABSTRACT

A follow-up study was conducted, using a sample of 10 teachers from two of five school districts that participated in an original project on wait time and classroom interaction. A workshop was conducted focusing on the elements of classroom discussions. In this workshop, transcripts containing short wait times were contrasted with ones with longer wait times. After attending the workshop, teachers were provided with an electronic device which indicated successful pausing (according to a 3 second criterion) following questions and answers. Each participant made a recording of one class discussion every week for 4 weeks. Recordings were analyzed by researchers for wait times and levels of questioning, and suggestions were offered to the teachers. Results showed a strong correspondence between increases in wait times and percentage of student talk, between wait times and higher cognitive level questions, and between length of wait time and length of relevant student discussion contributions. (Authors/JM)

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Improving and Encouraging Discussions in the Classroom

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Abstract

Debriefing discussions with teachers who participated in an earlier project conducted by the authors revealed that teachers claim that they must move quickly due to three beliefs that they hold about their teaching and about their students: (1) the amount of content coverage necessary, (2) concern over motivation of students, and (3) potential for disciplinary problems. A follow-up study was conducted using a sample of ten teachers selected from two of the five school districts that participated in the original project on wait time and classroom interaction. The procedure followed was to visit each of the schools where the teachers were located and to conduct workshops that focused on the elements of classroom discussions. The teachers participated in a two-and-one-half hour workshop in which a transcript containing short wait times was reenacted and contrasted with one with longer wait times. Each teacher was provided with an electronic device which would supply an immediate indication of successful pausing to a three second criterion following questions and answers. Each of the ten participants made a tape recording of one class discussion every week for four weeks. Analysis of wait times and question levels was conducted immediately by the researchers and supportive suggestions were given to each participant on a weekly basis. Data for each teacher was tabulated and compared with the data gathered for the same ten participants in the previous study. Highly significant differences were found between the scores on the follow-up study and the original project. The teachers changed their behavior decisively as did their students. Wait times were increased to the three second criterion sought. There was a large decrease in the amount of teacher talk and a corresponding increase in the amount of student discussion. The mean length of relevant statements by students increased significantly. A large increase in the proportion of questions at the application, divergent, and evaluative levels was found.

IMPROVING AND ENCOURAGING DISCUSSIONS IN THE CLASSROOM

You have probably heard many educators start their sessions with the statement "Today, we are going to discuss..." Based on our examination of classroom data, this term "discuss" seems to be misused. Often, that which follows the introductory statement bears little resemblance to a real discussion, usually turning into a lecture, rapid-fire drill, or an "inquisition."

Our research team was in the process of analyzing classroom discussions in a study of teacher-student interaction when it was noted that the quality of many classroom discussions was poor or non-existent. It was then decided to address this issue in a follow-up project. Unfortunately, classroom dialogue in middle school science classrooms is almost exclusively conducted at the lowest memory level as delineated in Bloom's taxonomy of learning (Blosser, 1973). Furthermore, typical classroom discussions are so fast-paced that thinking time for students is practically absent. Finally, most "so called" classroom discussions are not really discussions at all. They tend to be mostly lectures with a few questions interspersed here and there. Questions, which are used by the teacher in some cases as disciplinary tools, seem designed to punish students observed not to be listening to the "discussion" (i.e. lecture).

Background:

The data base for our assertions concerning typical classroom discussions is extensive, covering nearly 500 class sessions. The original research project funded by the National Science Foundation, entitled "Wait Time and Questioning Skills of Middle School Science Teachers" (Swift & Gooding, in press) was designed to determine the effects of increasing the pauses of teachers and students in classroom interaction. Without special training, pauses (wait times) in teacher-student dialogue are indeed short as has been

determined by several researchers (Rowe, 1974; Tobin, 1980). Our work found that pauses average only 1.25 seconds between teachers' questions and student replies and only .55 seconds between the students' replies and the subsequent comments by the teachers. These pauses were measured using novel computer-driven pause timing procedures (Gooding, Gooding, Swift, 1982).

In the original study we asked 40 teachers to tape record a discussion in one of their classes each week for 15 weeks. We were surprised to find that most of the tape recordings were fast-paced drill (or review) for tests, with emphasis on low level memory questions, or were lectures punctuated by brief questions apparently designed to keep the students alert. Few could be classified as discussions or inquiry lessons having the intent of development of the intellectual processes of students.

Our research supported the studies cited in the reviews by Gall (1970) and McGlathery (1978) which stated that most of the content of lessons was at the lowest intellectual levels. We also found, as did Robinson (1977) in a recent review of educational research, that students typically do not ask questions in classroom discussions, nor are they encouraged to do so. Thus it seems that, while research has revealed that memory level drill and lecture are not the optimal facilitators of learning, teachers persistently follow these strategies.

Follow-up discussions with teachers who participated in our research revealed that teachers claim that they must move quickly due to three beliefs that they hold about their teaching and about their students. First, teachers expressed concern that there was so much content to cover that they could not take time for interaction. Second, the teachers felt that, if they slowed the rapid-fire pace of their teaching to permit more student input, motivation would flag. Third, they thought pausing would precipitate disciplinary problems

in their classrooms. Thus, concern about content, motivation, and discipline, three of the most important factors in the classroom, are most often stated as reasons teachers keep their classes moving at such a rapid instructional pace. Coupled with a lack of a comprehension of procedures for the conduct of classroom discussions, classrooms have frequently taken on an appearance that has been characterized by Rowe as an "inquisition."

The Follow-up project procedure:

In view of our earlier findings we decided to conduct a follow-up study using a sample of ten teachers selected from two of the five school districts that participated in our earlier project on wait time and classroom interaction. Two major changes from the experimental study were initiated in the follow-up study, both involving increased contact between the research staff and the participants. (Personal contact was kept to a minimum in the previous study to minimize bias.) The first follow-up intervention was a workshop which encouraged the teachers to utilize discussions and adequate wait time. The second intervention was supportive feedback which reinforced behaviors suggested in the workshop. One other change was a reduction in the duration of the follow-up study to four weeks from 15, necessitated by teaching commitments of the research staff.

The teachers participated in a two-and-one-half hour workshop in which a transcript containing short wait times was reenacted and contrasted with one with longer wait times. We stressed the fact that waiting three seconds between student and teacher interaction produced higher cognitive levels of discourse, according to our data. Also stressed was the fact that with longer wait times our data indicated that students gave longer relevant answers and had increased opportunities to engage in dialogue with teachers and classmates. Furthermore, we provided evidence to the teachers showing that increasing their

wait times following questions and answers produced no significant differences with respect to discipline in the classroom. We also indicated several methods for engendering true discussions and suggested that they be tried. Finally, each teacher was provided with an electronic device which would supply an immediate indication of successful pausing to a three second criterion following questions and answers. This time length was selected based on research conducted by Rowe (1974) which indicated that a three second pause was the minimum to permit adequate thinking time for both teachers and students.

Supportive feedback was provided to the ten participating teachers by timely analysis of tape recordings made each week of their classroom discussions. The recordings were collected on each Friday and analyzed during the weekend. Emphasis was placed on successful implementation of the three second wait times, operation at higher cognitive levels of thinking, and utilization of student interaction. Individual consultation during planning time on each Monday provided opportunities for supportive feedback and discussion of teaching successes.

By way of illustration, the following material exemplifies the feedback provided after analysis of tapes #1 and #3 of a middle school science teacher. Week #1, participant E.

> This was an interesting class. We really enjoyed listening to it. There are several reasons we liked it. Your talk is moderately paced. You are observing increased wait time 1 before calling on students. This will facilitate effective responding. Wait time 2 should be further extended. Students frequently do not observe wait time 1 or 2. This can be improved if you will call on a specific person each time following your

pause. We note that you are posing higher cognitive level questions, but the students need more thinking time. That would also facilitate interaction of more students and student-student dialogue. You are making effective use of prediction level questions (see guide #5). Try to move to divergent and evaluative level questions on one or two occasions in your next discussion.

Week #3, participant E.

That was an interesting discussion: We found it to be quite exciting. Several important things happened. Your procedure of asking students to provide explanations is an effective form of an open question. This creates multiple avenues for exploration. Following this request with the question you posed, "What are some other possibilities?" keeps the class on task. A productive strategy. The next move you made was to talk about using appropriate terminology. Very timely. The students are then actively involved and are able to see the need to use a standard terminology which has a specific meaning. Your use of pauses continues to improve. Your wait times are significantly extended beyond your pauses in the previous study. At that time your average wait time 1 was 1.9 seconds and wait time 2 was .55. Your pauses are reaching 3 seconds or beyond on most occasions now. Keep working at maintaining your pauses at the 3 second criterion. This is going well for you at present. We note the presence of divergent and evaluative level questions in your discussion. These have produced

extended student responses. The increase in the length of student input is impressive. This lesson would have been a time when you could ask a student to summarize the key ideas that had been presented and discussed. Teachers typically find it difficult to make such a move. (To trust a student to pull things together teachers find risky.) However, it can be helpful for the class to hear things summed up by one of their peers. In addition, it provides you with a check on the completeness of understanding developed during the discussion.

Results of the follow-up project:

The feedback strategy produced far more powerful changes in teacher behavior than we had anticipated. The previous 15 week study revealed that wait times could be significantly extended using wait time feedback devices (Swift, Gooding, in press). In the follow-up project verbal feedback was provided on a weekly basis. Supportive feedback in this project was defined as the utilization of positive comments to effect improvements in teaching behavior. Teachers were given positive verbal comments for behavior which was extended beyond the baseline performance level whereas behavior that was negative or contradictory (e.g. shorter wait time, or increased numbers of low level memory questions in discussion) was ignored.

The positive outcomes noted concerning the quality of instructional behavior in classroom discussion may be seen from an inspection of the correlations noted below. These data reveal a strong correspondonce between increases in wait times and percentage of student talk (R = .805), between wait times and higher cognitive level questions (R = .851), and between length of wait time and length of relevant student discussion contributions

(r = .854). All of these results are accepted indicators of improved quality of classroom discussion.

The effectiveness of the wait timer in increasing pauses in classroom discussion was demonstrated in the semester length study. As can be seen from comparison of those results with the follow up project, providing teachers with a workshop experience and weekly feedback on their discussions produced dramatic behavioral changes beyond that achieved in the first study. The mean for wait time 1 increased from approximately 2 seconds to more than 3 seconds, while the mean of wait time 2 increased from below 1 second to more than 2.5 seconds. Such powerful changes were unexpected by the research team. Teachers changed their behavior decisively as did their students.

There was a large decrease in the amount of teacher talk and a corresponding increase in the amount of student discussion. The mean length of relevant statements by students increased significantly, indicating greater complexity of thought (Smith, 1977). Questions asked by teachers were classified according to cognitive level (Blosser, 1973). A large increase in the proportion of questions at the application, divergent, and evaluative levels was found. These behavior changes help explain why teachers who use adequate wait time have greatly improved achievement levels in science (Wise & Okey, 1982).

In sum, the authors have determined that effective use of wait time can result in spontaneous improvements in both cognitive and affective variables in the classroom. These changes are enhanced if information of wait time is supplemented by supportive suggestions from persons who have carefully listened to tape recordings of classroom interaction. In an era of low teacher turnover and an aging teacher population, methods that effectively improve the skills of in-service teachers are of vital importance. It appears that monitoring wait times using an electronic device accompanied by skilled analysis of tape recordings and supportive comments does indeed provide an avenue to the improvement of teaching skills.

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